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## From the Editors

This new volume of the journal opens with an issue on the theme of Victorian flora. While there is nothing unusual in that, we note the advantages in having to hand a number of papers with commonality of theme. When this happens we think it makes for a more focused issue, in which the interests of one group of naturalists can be more widely covered. From time to time, such co-incidences occur for most of the natural history areas covered by *The Victorian Naturalist*. For this reason the next issue (April 2012) will focus on fauna.

Looking further ahead for this year, we hope to publish in a later issue the papers from the most recent of the FNCV's annual Biodiversity Symposia. Picking up on the fact that 2011 was the International Year of Forests, the theme of that Symposium, held in November 2011, was 'Forests'.

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# The Victorian Naturalist

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**Front cover:** Eucalypt in flower in Murray Sunset National Park. Photo by Anne Morton.
**Back cover:** *Correa reflexa.* Photo by Jurrie Hubregtse.

# The 'inch flora': some observations on the morphology and seed biology of annual plant species common in semi-arid woodlands of western Victoria

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**Abstract**
Annual plants are an under-studied component of the Victorian flora. We describe the morphology and seed biology of ten species common to semi-arid woodlands in far western Victoria: *Actinobole uliginosum, Blennospora drummondii, Calandrinia granulifera, Centrolepis strigosa, Millotia tenuifolia, Podotheca angustifolia, Pogonolepis muelleriana, Quinetia urvillei, Rhodanthe pygmaea, Triptilodiscus pygmaeus*. Two forms of growth morphology were observed— 'erect' and 'branched'. Three species were found to have myxospermous seeds. Here, the seed coat contains a mass of dry mucilage which hydrates and swells rapidly on contact with water. Eight species appear to have dormant seed at the time of dispersal, presumably a strategy to avoid germination in summer. This dormancy was overcome when seed was heated to 35°C for 4 weeks. Our preliminary studies confirm that annuals are a fascinating group of plants which warrant much better ecological understanding. Further quantitative investigation of the seed biology (particularly the extent and role of myxospermy), seed germination requirements (including dormancy-breaking mechanisms) and developmental anatomy are clearly necessary. (*The Victorian Naturalist* **129** (1) 2012, 4-9).

**Keywords:** germination, growth form, myxospermy, seed dormancy, annual flora

## Introduction

Annual plants of the world's arid ecosystems can be divided into those that flower and seed in the summer and those that carry out those activities in winter-spring. Annual species from low rainfall zones in western Victoria fit comfortably into the winter-spring active group, using the winter-dominant rainfall that occurs in this region. While annuals are a common component of semi-arid woodlands and mallee shrublands in southern Australia (e.g. Rice and Westoby 1983; van der Moezel and Bell 1989; Morgan *et al.* 2011), few species have received detailed ecological study. Indeed, of the species we studied, only the seed dormancy and germination of *Actinobole uliginosum* has been previously reported (Hoyle *et al.* 2008). Hence, in this contribution, we introduce aspects of the morphology and seed biology of a suite of annual species common to semi-arid eucalypt woodlands in Victoria based on our observations of these much-overlooked plants.

## Morphology and seed biology

We studied 10 species typically found in the 'inch flora' of semi-arid woodlands in western and north-western Victoria (Table 1). One species (*Quinetia urvillei*) is classified as rare in Victoria. The maximum height of all species is <100 mm, with several species strictly <30 mm tall at maturity. All species we have observed demonstrate one of two characteristic growth morphologies (Table 1). Species either develop (i) a single shoot which bears just one terminal inflorescence ('erect' habit; Fig. 1), or (ii) one or more additional shoots are produced from lateral buds on the primary axis ('branched' habit; Fig. 2). These lateral shoots appear to grow diageotropically and then curve upwards, bearing either inflorescences or further shoots that, in turn, bear inflorescences in a more or less erect position. Six species have 'branched' habit but there is much variation. *Blennosperma drummondii*, for instance, omits the development of the lateral shoot stage and has either just one single shoot with a terminal inflorescence, or two or more laterals that grow at an angle that is steeply inclined to the vertical, each terminated by a single smaller inflorescence. In *Pogonolepis muelleriana*, it is very clear that when additional branches arise from the diageotropic laterals, the size of the inflorescences produced are smaller than those produced terminally by

**Table 1.** Height, growth form morphology and evidence of myxospermy for ten annual plant species common to semi-arid woodlands in western Victoria. * Height <30 mm; ** Comprising a single shoot which may bear just one terminal inflorescence (erect), or one or more additional shoots are produced from lateral buds on the primary axis (branched); *** Seeds rich in mucilage which hydrates rapidly on wetting; **** Seeds surrounded by hairs that turn mucilaginous on wetting.

| Species | Family | Inch Plant* | Morphology** | Myxospermous*** |
|---|---|---|---|---|
| *Actinobole uliginosum* | Asteraceae | Strict | Branched | Yes |
| *Blennospora drummondii* | Asteraceae | Strict | Branched | Yes |
| *Calandrinia granulifera* | Portulacaceae | Strict | Branched | No |
| *Centrolepis strigosa* | Centrolepidaceae | Strict | Branched | No |
| *Millotia tenuifolia* | Astercaeae | No | Erect | No |
| *Podotheca angustifolia* | Asteraceae | Variable | Branched | No |
| *Pogonolepis muelleriana* | Asteraceae | Strict | Branched | Yes |
| *Quinetia urvillei* | Asteraceae | No | Erect | No |
| *Rhodanthe pygmaea* | Asteraceae | Variable | Erect | No**** |
| *Triptilodiscus pygmaeus* | Asteraceae | Variable | Erect | No |

the original diageotropic shoot. This is equally true with *Blennosperma drummondii*.

Three species (*Actinobole uliginosum*, *Blennospora drummondii*, *Pogonolepis muelleriana*) have myxospermous seeds. Here, the seed coat contains a mass of dry mucilage when the seeds are shed. The mucilage hydrates and swells rapidly on contact with water, in some cases in as little as a few minutes (Fig. 3). In *Rhodanthe pygmaea*, seeds are surrounded by hairs that turn mucilaginous on wetting. Myxospermy




**Fig. 1.** Examples of annual plants with 'erect' growth morphology where a single shoot bears a terminal inflorescence. (a) *Millotia tenuifolia*, (b) *Siloxerus multiflorus* and (c) *Gnephosis drummondii*. Photos by Pete Green.

**Fig. 2.** *Actinobole uliginosum* is an example of a species with 'branched' growth morphology where one or more shoots are produced from lateral buds on the primary axis. Photo by Pete Green.

has been studied in many species of desert plants (reviewed by Fahn and Cutler 1992), and been found to be common in plant families such as Plantaginaceae and Asteraceae. Interestingly, myxospermy is common in winter annuals of Israel and South Africa (van Rheede van Oudtshoorn and van Rooyen 1998); however, it does not appear to have been investigated much in Australian annual species. A number of theories have been suggested about its significance and mxyospermy might be important when seeds are both wet and dry. We are inclined to the idea that it assists the seed to attach to the soil, giving the radicle something to push against as it starts to elongate, minimising the risk of pushing the root hair zone away from the soil surface. This might be particularly important where the substrate is covered by a biological soil crust as is common in semi-arid areas. Clearly this is an area in need of much greater study.

**Observations on developmental anatomy**

A feature of annual plants is their ability to grow rapidly after germination, establish one or more shoots that bear inflorescences, and then to flower and produce seed rapidly. One can speculate that achieving this end has sparked the creation of the 'branched' morphology we observed. First, photosynthetic tissue needs to be close to the sites at which photosynthates are consumed, because it is almost an axiom of phloem function that the shorter the distance between source and sink, the more rapidly photosynthetic products are moved to their destination. In plants with this 'branched' morphology, such morphology guarantees that the sinks and the source of photosynthates are never more than a few centimetres apart.

The water and mineral nutrition for these axes will be drawn from soil and the root systems, and some water will no doubt be taken up

**Fig. 3.** Evidence of myxospermy in *Blennosperma drummondii* (foreground) compared to a species which is not myxospermous (*Podotheca angustifolia*, background). In this example, the mucilage had hydrated and swelled rapidly on contact with water applied 15 minutes previously. Photo by John Morgan.

by absorption through growing leaf surfaces, in some cases as dew; however, there are no studies on the developmental anatomy and histology of any of these species with these issues in mind. The uptake of water, photosynthates and minerals into the developing flower heads and seeds of these species, with the urgency created by the relatively short growing season, and its timing with respect to vascular development, will likely be of considerable interest to ecophysiologists.

Our preliminary observations suggest that the root system engages in a similar pattern of development to that of the shoots. A primary radicle emerges rapidly from below the hypocotyl which may or may not have a corona of hypocotyl hairs. During this stage, many seedlings have their cotyledons still encased in a seed coat and, in the case of myxospermous species, the seed coats are firmly stuck to the substrate. This radicle grows vertically and rapidly, reaching a depth of 70 mm when the cotyledons have barely finished unfolding. In soil, this primary root develops lateral branches at regular intervals (5–10 mm), laterals which are also strongly diageotropic from the moment they emerge from the stele of the parent root. These laterals then produce vertical roots with numerous root hairs which can adhere strongly to sand grains in the soil. A detailed analysis of the root morphology, including development of the mycorrhizas known to be a feature of plants growing in these habitats (Warcup and McGee 1983), and of the soil sheaths identified by McCully (1987), which have been shown to permit non-rhizobial $N_2$ fixation, await detailed study.

**Preliminary studies of germination**

We collected ripe seeds from all species in October–November 2009 from a number of state forests between Horsham, Dimboola and Goroke in western Victoria to examine the cues for germination in annuals. In particular, we were interested in the temperatures that promote germination and the environmental cues

**Table 2.** Summary of the germination response of ten annual plant species to move-along (MA1-3) treatments on fresh seed. A fourth germination treatment on fresh seed was preceded by heating seeds at 35°C for four weeks prior to sowing.

| Species | Experimental Treatment | | | |
|---|---|---|---|---|
| | MA1: 30°C (12 hrs light/dark) | MA2: 20°C (12 hrs light/dark) | MA3: $GA_3$ @ 20°C (12 hrs light/dark) | Seed heating @ 35°C then 20°C (12 hrs light/dark) |
| *Actinobole uliginosum* | No | No | No | Yes |
| *Blennospora drummondii* | Yes - substantial | Not tested | Not tested | Yes |
| *Calandrinia granulifera* | No | Yes - substantial | Not tested | Yes |
| *Centrolepis strigosa* | No | No | Yes - minimal | No |
| *Millotia tenuifolia* | No | No | No | Yes |
| *Podotheca angustifolia* | No | No | No | Yes |
| *Pogonolepis muelleriana* | No | No | Yes | Yes |
| *Quinetia urvillei* | No | No | No | Yes |
| *Rhodanthe pygmaea* | No | No | No | Yes |
| *Triptilodiscus pygmaeus* | No | No | Yes | Yes |

that might be necessary to overcome dormancy. We do not report germination experiments *per se*; rather, we make observations of likely germination strategies in these species as a precursor to more formal study.

Within two months of seed collection, we started Germination Trial 1. We placed 70-100 filled seeds of each species on Whatman No. 1 filter paper in individual 90 mm Petri dishes and placed them at 30°C constant temperature in a Thermoline growth cabinet (12 hrs light/12 hrs dark). We were interested in whether fresh seed would resist germination upon wetting at high temperature. Within one week, *Blennosperma drummondii* had produced a few germinants; all other species showed no signs of activity. After 3 weeks, *Blennosperma* had achieved a germination of approximately 70%, but no other species germinated at this temperature. At this time, we moved all Petri dishes to 20°C constant temperature (12 hrs light/12 hrs dark) (Germination Trial 2) in a 'move-along' experiment (i.e. seed exposed to one treatment that does not induce germination are moved to a second treatment in an attempt to do so).

*Calandrinia granulifera* germinated rapidly when seeds were moved to 20°C; >80% germination was observed within three days of starting this trial. No germination, however, was recorded for any other species at this temperature suggesting that seeds have a physiological dormancy upon being shed.

After another 3 weeks, we started Germination Trial 3 in an attempt to overcome dormancy of seeds. Gibberellic acid ($GA_3$), known from the literature to be capable of breaking dormancy in some desert annuals (Plummer and Bell 1995), was added to all Petri dishes where no germination had previously been recorded (i.e. 8 of the 10 species). We treated each Petri dish with 7.5 ml of $GA_3$ (at 200 mg/l), and then returned dishes to the growth cabinet at 20 °C (12 hrs light/12 hrs dark). This experiment released the dormancy of some species including *Centrolepis strigosa*, *Pogonolepis muelleriana* and *Triptilodiscus pygmaeus*; however, for *Actinobole uliginosum, Millotia tenuifolia, Podotheca angustifolia, Quinetia urvillei* and *Rhodanthe pygmaea*, no germination was observed.

Finally, in Germination Trial 4, we exposed filled seed of all species to 28 days of heating at 35 °C. This is considered a form of dry after-ripening. Heating was achieved by placing seeds in paper bags inside a thermostatically controlled oven. After heating, 70-100 seeds of each species were placed on Whatman No. 1 filter paper in 90 mm Petri dishes, as before, and placed at 20 °C constant temperature, with 12 hrs light / 12 hrs dark. All species, except *Centrolepis strigosa*, germinated in the 3 weeks after we started this trial. Germination was high; 60-80% germination was observed in all species. We summarise these outcomes in Table 2.

We conclude from these observations that the common seasonal pattern of high summer temperatures and a variable period of low rainfall combine to render the seed of many annual species initially dormant upon dispersal. *Blennospora drummondii* and *Calandrinia granulifera* would appear to be exceptions; they await the arrival of appropriate temperatures and moisture to germinate. As the summer progresses, the high temperatures that seeds experience at (or near) the soil surface appear likely to slowly reduce the dormancy of the embryo, which eventually responds to the combination of cooler conditions and moisture by rapidly germinating. *Actinobole uliginosum, Millotia tenuifolia, Podotheca angustifolia, Quinetia urvillei* and *Rhodanthe pygmaea* all appear to respond in this manner.

## Conclusions

The ecology of annual plants has largely been overlooked in southern Australia, despite the important contribution they make to diversity in semi-arid woodlands and mallee shrublands. Hence, our observations were undertaken in the almost complete absence of published literature. By describing the variation that exists in morphology and seed biology of this group, we have demonstrated that annual plant species exhibit a fascinating array of strategies to cope with their environment. We hope that this stimulates further quantitative study of the 'inch flora'.

## Acknowledgements

Technical assistance was provided by Max Bartley and Pete Green kindly allowed us to use his photographs. Professor Roger Parish gave on-going encouragement and support.

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## One hundred and twenty-eight years ago

MALLEE HENS AND THEIR EGG MOUNDS

By A.J. Campbell

(Read before the Field Naturalists' Club of Victoria, Dec. 8, 1884)

...When anything is mentioned about the Mallee country, there is instantly conveyed to the mind of many people a vivid picture of desert land, the abode only of wild dogs and latterly of rabbits. Never was there a greater error. It is predicted that in the near future the Mallee country will be among the most fruitful and productive parts of the Colony of Victoria. The Mallee scrub is a species of dwarf gum-tree or Eucalyptus, and 10 to 12 small trees spring from the one root. The foliage spreads over-head 10 to 20 feet above the ground. The wood is hard and durable, the bark as a rule smooth and thin.

This scrub generally grows in a loose yellowish sandy soil, and in long belts varying from half a mile to miles in breadth. Between the belts there are corresponding good tracts of country more openly timbered with bull-oak, and still more thickly in parts where they are interspersed with one or more varieties of gum trees, Murray pine, &c.

From *The Victorian Naturalist* I, p. 124, December 1884

# Bindweeds (*Convolvulus* L.: Convolvulaceae) in Victoria

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**Abstract**
The Victorian taxa of *Convolvulus* are outlined with illustrations of diagnostic parts, distributions and a key to the taxa. A brief account of the taxonomic history of the group in the state is provided and some features of the species' biology and ecology are discussed. (*The Victorian Naturalist* **128**(6) 2011, 10-19).

**Keywords**: Victorian flora update

## Introduction

In 2001 an excellent revision of the bindweed genus (*Convolvulus*) in Australia was published (Johnson 2001). All the native and the solitary introduced species were treated in detail. Four new species were described and a further three previously named but subsequently synonymised species resurrected. Two other new species had been published previously (Johnson 1987). Prior to this, native species in Australia were included in very broad concepts of *C. erubescens* and to a lesser extent *C. remotus*, but the diversity contained within these two 'catch-all' species led to uncertainty of the application of those names. In fact, *C. erubescens* was not considered a member of the Victorian flora by Johnson (2001), and *C. remotus* was a rather rare species for the state. Of the 11 native species recognised by Johnson (2001), seven were from Victoria. One of these, *C. microsepalus*, was known from only two pre-1900 records and it is now regarded as extinct in the state. Subsequent to Johnson's revision, *C. erubescens* has been 'rediscovered' in Victoria, and a further species, *C. graminetinus*, recorded for the state, bringing the tally of Victorian species to 10, with one of these, *C. angustissimus*, comprising three subspecies here (a fourth subspecies is confined to the Yorke and Eyre Peninsulas and Kangaroo Island in South Australia).

### The genus in Victoria

Despite the significance of the revision—elucidating as it does some rare taxa, and some that are highly characteristic of different habitats—it appears not to have been widely taken up by Victorian botanists. The following is an attempt to improve the understanding of the genus in this state and to update the now inadequate (and to some extent misleading) treatment in the *Flora of Victoria* (Jeanes 1999) where only four species were recognised. The present account draws heavily on Johnson's revision and I am indebted to him for that and his subsequent co-operation in improving my own understanding of the genus in Victoria. Redetermination of herbarium material and the subsequent collections of my own and others have allowed a clearer picture of distribution and ecological preferences of the Victorian species than the revision could provide. The original article provides detailed descriptions of the taxa and much more information on the genus than is supplied here. Important characteristics of the Victorian taxa are summarised in Table 1.

### Biology

Since the publication of Johnson's revision, there have been many large bushfires in Victoria, and post-fire surveys have been the source of novel records of several *Convolvulus* species, in particular, *C. crispifolius*, *C. erubescens* and *C. clementii*, suggesting that these species may be scarce in long inter-fire periods and that the species may not be particularly long-lived. Alternatively, this may be an artefact of increased survey effort after fires. The germination of other species from sites prone to inundation (e.g. *C. wimmerensis*, *C. recurvatus* and possibly *C. graminetinus*) appears to be stimulated by seasonal flooding (pers. obs.).

**Table 1.** Summary of important features of Victorian *Convolvulus* taxa. *The 'flower stalk' consists of the peduncle + pedicel. In species with single-flowered inflorescences, the pedicel is measured from the two small bracteoles, usually about halfway along the 'flower stalk', to the calyx. In multi-flowered inflorescences, the pedicel of the lower flowers is measured from where it joins the peduncle (one or two bracteoles are inserted at this branching point). Pedicels may elongate in fruit. The ranges here are taken from flowering pedicels.

| | Habit | Stem | Pedicel* | Sepal | Corolla (mm) | Capsule (mm) | Seed (mm) | Habitat |
|---|---|---|---|---|---|---|---|---|
| **angustissimus** subsp. **angustissimus** | twining | terete, variably pubescent; hairs appressed and spreading | 3–23 mm; recurved in fruit | 4–6 mm; acute to rounded with short recurved point | 9–21 | 4–8 | 2.9–4 | grassland and woodland; clay to skeletal soil |
| **angustissimus** subsp. **fililobus** | twining | terete; hairs mostly sparse, appressed | 4–8 mm; recurved in fruit | 3.5–5 mm; acute to rounded with short recurved point | 9–14 | 6–6.5 | 3–4 | grassland and grassy woodland; mostly clay/clay loam |
| **angustissimus** subsp. **omnigracilis** | trailing, rarely twining | terete, variably pubescent with appressed and spreading hairs | 5–18 mm; recurved in fruit | 4.5–6 mm; acute to rounded with short recurved point | 14–25 | 5–8 | 3.5–4 | grassland and woodland; clay to skeletal soil |
| **arvensis** | trailing and twining | terete or narrowly winged; mostly glabrous | 6–22 mm; recurved in fruit | 3–4 mm; tip notched | 15–30 | 4–7 | 3–4 | disturbed sites |
| **clementii** | twining | terete; moderately to sparsely hairy; hairs ±appressed | 3–15 mm; straight to slightly curved in fruit | 4–6 mm; long, acute to rounded with a recurved point | 6–9 | 4–7 | 2.5–3 | black box, saltbush and grasslands; clay and clay loam |
| **crispifolius** | trailing | terete, rather densely hairy; hairs appressed to ascending | 1.5–4 mm; recurved in fruit | 4–4.5 mm; tip rounded–obtuse with recurved point | 5–6 | 4–4.5 | 2.5–3 | mallee; sand or sandy loam |
| **erubescens** | trailing and twining | ribbed to narrowly winged, moderately to sparsely hairy; hairs crisped, appressed | 5–20 mm; straight to very slightly recurved in fruit | 5–7 mm; tip acute with recurved point | 7–15 | 4.5–6 | 2.8–3.7 | known only from dryish site with limestone-rich soils in Victoria (elsewhere often a sp. of rainforest margins) |
| **graminetinus** | trailing to weakly twining | terete to ribbed, moderately to sparsely hairy; hairs crisped, appressed | 3–12 mm; recurved in fruit | 3–5 mm; tip acute to obtuse | 6–10 | 4–5.5 | 2.5–3.5 | grassland or open woodland with heavy soils, prone to inundation |

Table 1. Continued.

| | Habit | Stem | Pedicel* | Sepal | Corolla (mm) | Capsule (mm) | Seed (mm) | Habitat |
|---|---|---|---|---|---|---|---|---|
| **microsepalus** | trailing | terete, moderately to sparsely hairy; hairs ±appressed | 3–12 mm, recurved in fruit | 2–3 (rarely 4) mm; tip acute | 5–10 | 5–7 | 3.5–4 | unknown in Victoria (elsewhere in loamy or sandy soils in semi arid areas) |
| **recurvatus** ssp. **recurvatus** | trailing | terete, moderately hairy; hairs±appressed | 2–6, (rarely 8) mm, recurved in fruit | 3–5 mm, tip acute to rounded with a recurved point | 5–8 | 4–5 | 2.5–3.5 | heavy soils e.g. in black box–red gum forest |
| **remotus** | trailing | terete, sparsely to densely hairy; hairs appressed | 3–16 mm, straight to slightly recurved in fruit | 5–7 mm, tip obtuse, with or without a short point | 8–12 | 5.5–8.5 | 3–4.8 | grassland, chenopod shrubland on loamier mallee soils |
| **wimmerensis** | trailing to weakly twining | terete, moderately to densely hairy; hairs crisped-appressed | 3–6 mm, recurved in fruit | 5–6.5 mm, rounded with a short recurved point | 9–12 | 5.5–6 | 3.2–3.8 | grassland, grassy woodland on clay or clay-loam soils |

**Collecting**

When collecting or recording specimens of *Convolvulus*, it is important to note characters which may be lost or not apparent on herbarium specimens—e.g. corolla length and colour, the tendency for stems to twine, habitat, soil type etc. The surface-sculpturing of seeds is highly diagnostic for some species, so ripe fruits should be obtained if possible. The National Herbarium of Victoria will gratefully accept well-collected specimens, with locality and habitat information. Further contributions should allow us to build a more reliable picture of distribution, habitat and conservation status of the genus in Victoria. Potential collectors must ensure that they are appropriately licensed to collect on public land.

**Identification**

The key below relies largely on leaf morphology, which, with some practice, provides highly diagnostic field characters. When using the key, however, it is important to appreciate the variation in leaf shape from the juvenile leaves near the base of the plant to those at the growing tip. The leaves described in the key, unless indicated otherwise, are from the adult leaves from the mid- to upper-stems, in the part of the plant where flowers are produced. Summarised distributions in the key are based on current knowledge only. With further collections and improved understanding of the genus, species' occurrences outside their currently known ranges are to be anticipated. Abbreviations of occurrences in Natural Regions of Victoria (Conn 1992) follow those used in Walsh and Entwisle (1994, 1996, 1999).

The leaf and seed illustrations of the Victorian species (Figs 1–3 and 4–6 respectively), expertly depicted by Will Smith, are reproduced from Johnson (2001) with permission. While the leaf outlines give a good summary of typical leaf shapes from the base of the plant to the growing tips (from bottom to top in the figures), occasional plants will be found that deviate slightly from these. Generally though, I have found the illustrations to be a very useful pointer to the correct determinations. Seed surface sculpturing is also highly distinctive for most taxa, but requires magnification at ×10–20 using a microscope or good hand lens.

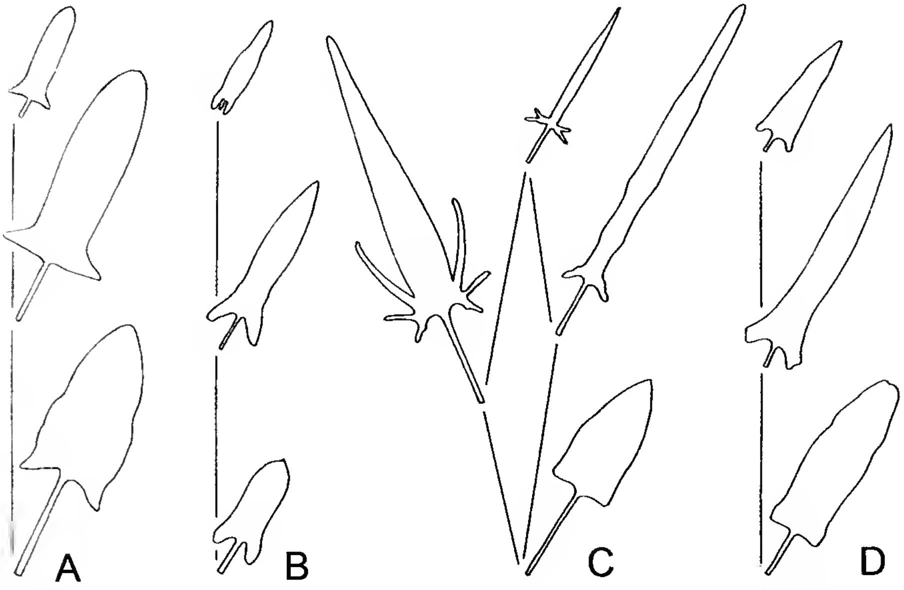


**Fig. 1**. Leaves (basal, mid-stem, upper stem) of *Convolvulus*. A: *C. arvensis* × 1; B: *C. microsepalus* × 2 (basal), × 1 (mid and upper); C: *C. graminetinus* × 0.5 (basal), × 1 (mid and upper); D: *C. remotus* × 1.

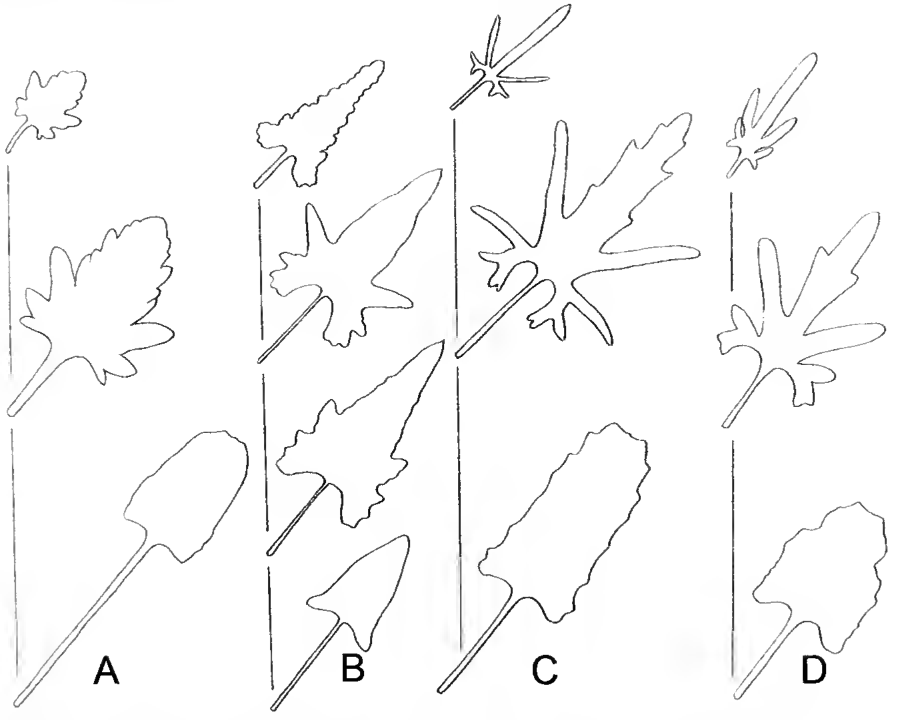


**Fig. 2**. Leaves (basal, mid-stem, upper stem) of *Convolvulus*. A: *C. crispifolius* × 1 (basal), × 2 (mid and upper); B: *C. erubescens* × 0.5 (basal and mid), × 2 (upper); C: *C. clementii* × 1; D: *C. wimmerensis* × 1.

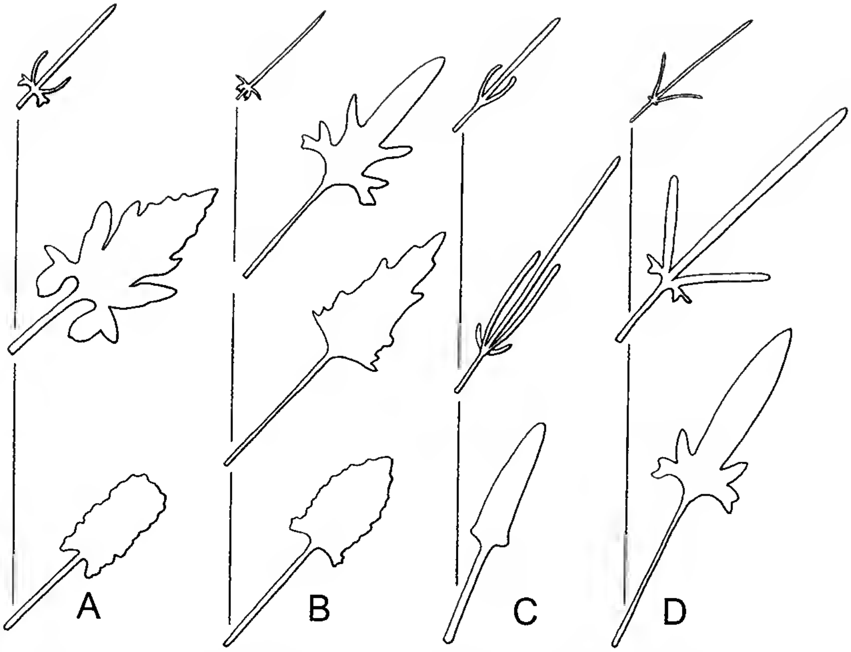


**Fig. 3**. Leaves (basal, mid-stem, upper stem) of *Convolvulus*. A: *C. recurvatus* × 1 (basal), × 2 (mid and upper); B: *C. angustissimus subsp. angustissimus* × 1 (basal and mid), × 2 (upper); C: *C. angustissimus* subsp. *omnigracilis* × 1 (basal and mid), × 2 (upper); D: *C. angustissimus* subsp. *fililobus* × 2.

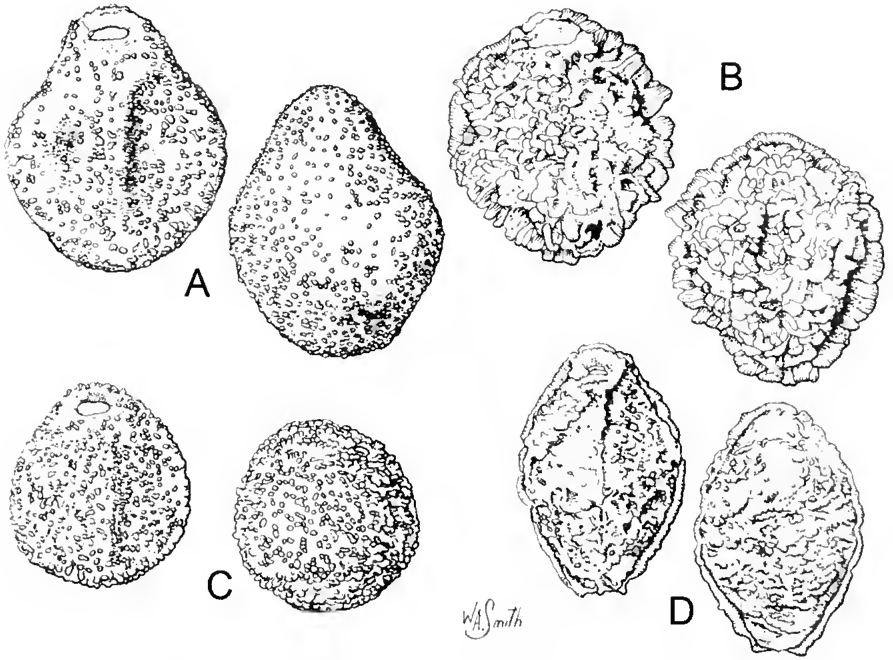


**Fig. 4**. Seeds of *Convolvulus*, ventral (left) and dorsal (right) surfaces × 10. A: *C. arvensis*; B: *C. microsepalus*; C: *C. graminetinus*; D: *C. remotus*.

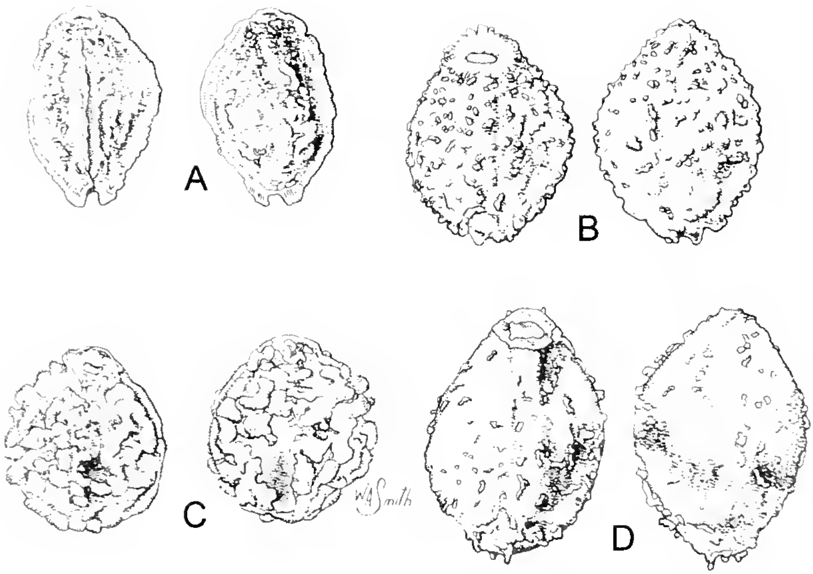


**Fig. 5.** Seeds of *Convolvulus*, ventral (left) and dorsal (right) surfaces × 10. A: *C. crispifolius*; B: *C. erubescens*; C: *C. clementii*; D: *C. wimmerensis*.

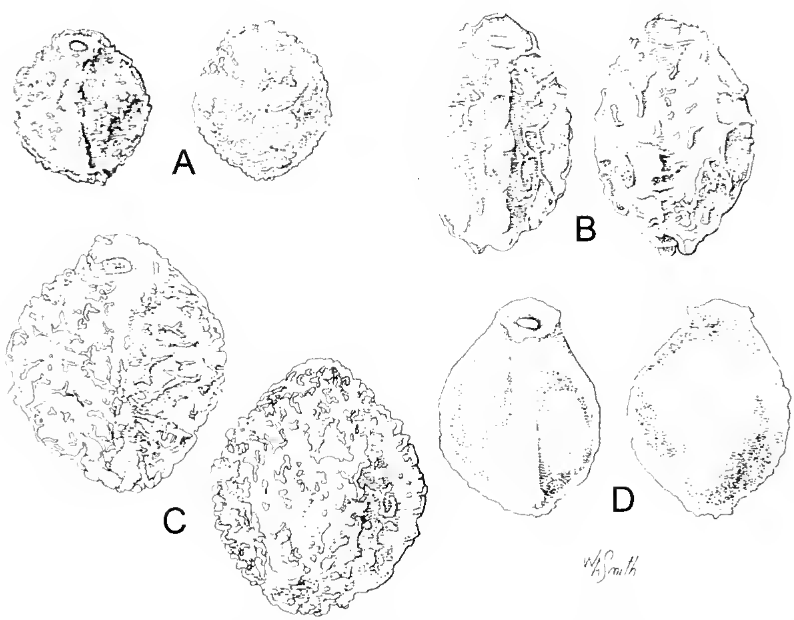


**Fig. 6**. Seeds of *Convolvulus*, ventral (left) and dorsal (right) surfaces × 10. A: *C. recurvatus* subsp. *recurvatus*; B: *C. angustissimus* subsp. *angustissimus*; C: *C. angustissimus* subsp. *onmigracilis*; D: *C. angustissimus* subsp. *fililobus*.

**Key to Victorian taxa of *Convolvulus***

1. Leaves hastate, sagittate, oblong or digitate, but not developing a distinct narrow (<2 mm wide) central/terminal lobe more than 5 times longer than the basal lobes (when present); fruiting pedicels straight to recurved ........ 2
1. Leaves with a distinct, narrow central lobe more than 5 times longer than short basal lobes, 2 mm wide or less; fruiting pedicels distinctly recurved ........ 11

2. Sepals ≤4 mm long, very blunt, with a shortly notched apex ........ 3
2. Sepals >4 mm long, acute to rounded at apex, usually with a short point, never notched ........ 4

3. Petals 15–30 mm long; sepals 3–4 mm long; vigorous weed, widespread, mostly disturbed or degraded sites ..... **C. arvensis* (MMAL, WAN, RIV, MID, VOLC, OTPL, GPL)
3. Petals 5–10 mm long; sepals usually <3 mm long; rather sparse native recorded from the far north-west, but now possibly extinct in Victoria ........ *C. microsepalus* (LMAL, WIM)

4. Leaves without obvious lobes, margins crenate or serrate; surfaces silky-pubescent with rather dense, ±appressed hairs; mallee areas of north-west ........ *C. crispifolius* (MMAL, LMAL)
4. Leaves usually with distinct (although sometimes short) basal lobes, sometimes ±digitate, margins generally entire, surfaces glabrescent to rather densely hairy, but not appressed-silky pubescent ........ 5

5. Leaf margins entire throughout the plant (ignoring short basal lobes if present) ........ 6
5. Leaf margins, at least near the base of plant, distinctly toothed or lobed ........ 7

6. Fruiting pedicels distinctly recurved; capsule ≤5.5 mm long; mature seeds patterned by small distinct tubercles only; petals to 10 mm long; northern plains and drier eastern ranges (Omeo area) ....... *C. graminetinus* (RIV, EHL, EG)
6. Fruiting pedicels straight or gently curved, but not recurved; capsule 5.5–8.5 mm long; mature seeds patterned by both tubercles and low ridges of irregular length; petals 8–12 mm long; mainly mallee areas of the north-west (outliers at Mt Arapiles and Wilsons Promontory) ........ *C. remotus* (MMAL, LMAL, WIM, GR, RIV, PROM)

7. Corolla <9 mm long; far north-west Victoria only ........ 8
7. Corolla >9 mm long; plants of east or west, but rarely of the far north-west ........ 9

8. Fruiting pedicel strongly recurved .......... *C. recurvatus* subsp. *recurvatus* (MMAL, LMAL)
8. Fruiting pedicel straight or sinuate but not strongly recurved ........ *C. clementii* (MMAL, LMAL)

9. Fruiting pedicels straight or sinuate; flowers 1–3 per axil; leaves shallowly lobed only, ±glabrous, at least above; stems ribbed to narrowly winged; confirmed from limestone areas of Gippsland, earlier records (Melbourne and Dookie areas) are based on specimens of dubious provenance ........ *C. erubescens* (?RIV, ?GPL, EG)
9. Fruiting pedicels distinctly recurved; flowers usually single (rarely two) per axil; at least lower leaves deeply and distinctly lobed; stems terete ........ 10

10. Leaves rather densely covered with ±appressed hairs, greyish, usually ±digitate, basal lobes usually >half as long as central lobe; north and west Victoria ........ *C. wimmerensis* (MMAL, LMAL, WIM, WAN, RIV)
10. Leaves glabrescent to moderately covered with spreading hairs, green, the central lobe usually >twice as long as basal lobes; widespread ........ *C. angustissimus subsp. angustissimus* (MMAL, WIM, WAN, GR, RIV, MID, VOLC, OTPL, EHL, GPL, PROM, SNOW, EG)

11. Corolla <9 mm long ........ 12
11. Corolla >9 mm long ........ 13

**12.** Sepals ±glabrous to sparsely hairy; fruiting pedicel 2–12 mm long; seeds fairly evenly tuberculate, lacking ridges, unwinged; northern plains and drier eastern ranges (Omeo area) ....... ***C. graminetinus*** (RIV, EHL, EG)

**12.** Sepals moderately to densely hairy; fruiting pedicel 3–6 mm long; seeds patterned by irregular tubercles and short ridges with an irregular marginal wing around the margin; far north-west Victoria only (*C. recurvatus* subsp. *nullaborensis* is confined to WA and SA) ....................................................... ***C. recurvatus*** (MMAL, LMAL)

**13.** Corolla to 10 mm long; seeds fairly evenly tuberculate; peduncle and stems usually narrowly winged or ribbed ....................................... ***C. graminetinus*** (RIV, EHL, EG)

**13.** Corolla to 25 mm long; seeds with low irregular ridges, or virtually smooth with a narrow marginal ridge or wing; peduncles and stems terete ...... **14 (*C. angustissimus*)**

**14.** Lower cauline leaves broad, deeply divided, often ±digitate, with the central lobe >1.5 mm wide; basal lobes usually reducing and central becoming narrower toward tip; corolla 9–21 mm long; widespread ................................................................... ***C. angustissimus*** subsp. ***angustissimus*** MMAL, WIM, WAN, GR, RIV, MID, VOLC, OTPL, EHL, GPL, PROM, SNOW, EG)

**14.** Cauline leaves with narrow lobes almost from the base of the plant; lobes <1.5 mm wide; mostly western and northern ................................................................ **15**

**15.** Seeds smooth; flowering pedicels 4–8 mm long; corolla 9–14 mm long ....... ***C. angustissimus*** subsp. ***fililobus*** (MMAL, WIM, GR, RIV, MID)

**15.** Seeds irregularly reticulate with low, narrow ridges; flowering pedicels 5–18 mm long; corolla 14–25 mm long .................................................. ***C. angustissimus*** subsp. ***omnigracilis*** (RIV, MID, VOLC, EHL, GPL, EG)

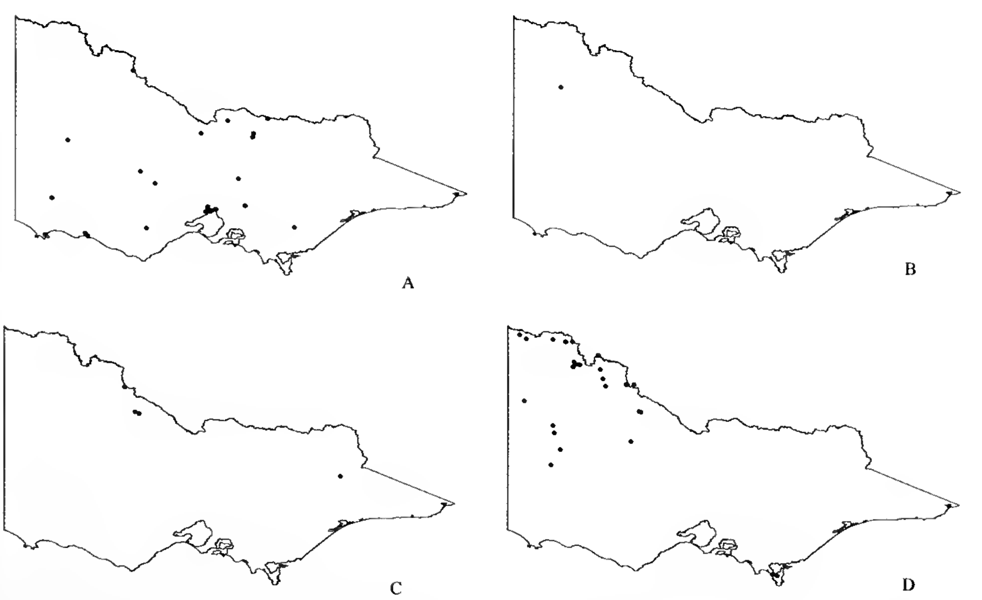


**Fig. 7.** Distribution of *Convolvulus* in Victoria. A: *C. arvensis*; B: *C. microsepalus*; C: *C. graminetinus*; D: *C. remotus*.

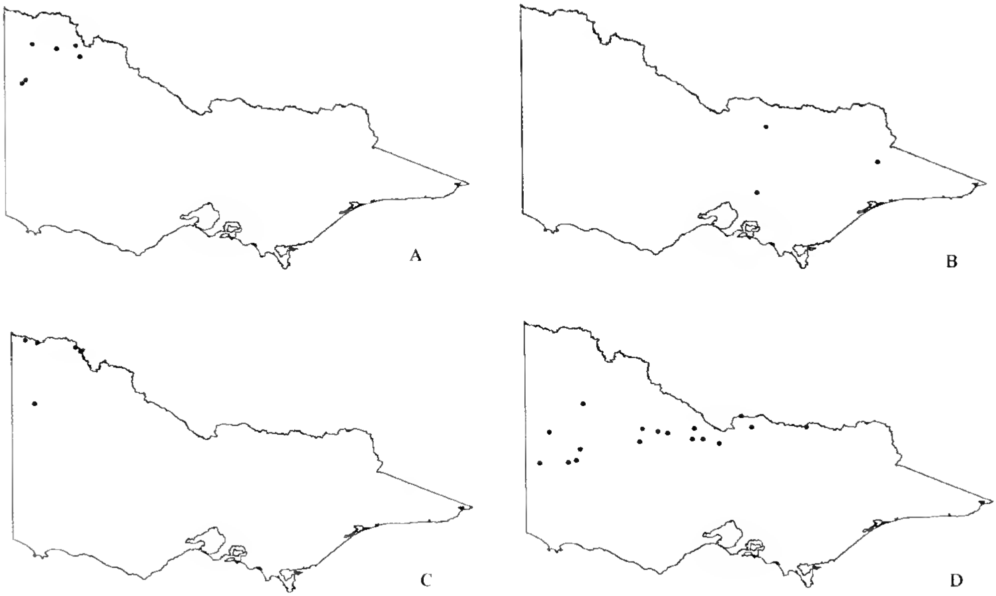


**Fig. 8.** Distribution of *Convolvulus* in Victoria. A: *C. crispifolius*; B: *C. erubescens* (only tbe easternmost record is recent and reliable); C: *C. clementii*; D: *C. wimmerensis*.

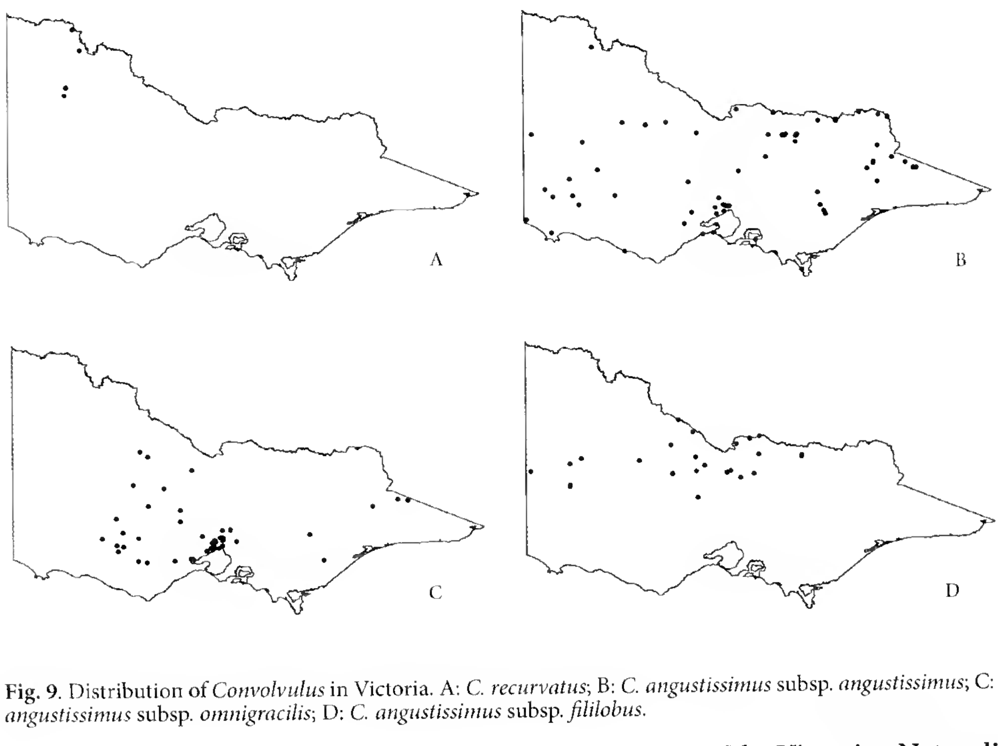


**Fig. 9.** Distribution of *Convolvulus* in Victoria. A: *C. recurvatus*; B: *C. angustissimus* subsp. *angustissimus*; C: *C. angustissimus* subsp. *omnigracilis*; D: *C. angustissimus* subsp. *fililobus*.

Distribution maps, derived from specimens held at the National Herbarium of Victoria, are presented in Figs 7–9.

**Acknowledgements**

I am very grateful to Bob Johnson (Brisbane Herbarium) for his generous assistance in improving my understanding of the genus, and for allowing his work (and the illustrations of his colleague, Will Smith) to be presented here with minor modifications. I thank too my colleague at the Royal Botanic Gardens, Alison Vaughan, for preparing the distribution maps.

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*Received 20 January 2011; accepted 25 August 2011*

## One hundred and five years ago

A BOTANIST AT MOUNT BULLER

By DR. C.S. Sutton

(Read before the Field Naturalists' Club of Victoria, 14th Jan., 1907)

...The Upper Paleozoic area of Mansfield is described by Mr. Reginald Murray as beautifully park-like in character—well grassed and thinly timbered, and having been long settled and always well stocked, the original flora has naturally suffered. In effect the only flowering plants seen on the flats were *Pimelia humilis, Goodenia pinnatifida, Viola hederacea, Vittadinia autralis* [sic], large patches of *Lobelia pedunculata, Erythraea australis, Convolulus erubescens*, and a profusion of *Hydrocotyle laxiflora*, often betraying itself by its characteristic colour, and *Helipterum dimorpholepis*. Among the low hills lying close to the town, and which seemingly had never carried much timber or scrub, my fortune was better, for I found *Hibbertia obtusifolia*, with its fine large bright yellow flowers, everywhere, and collected the curious little composite so like a gnaphalium, *Stuartina Muelleri*. The still smaller *Rutidosis pumilo* was very plentiful, and the charming little alien, *Alchemilla arvensis*, or Lady's Mantle, was noticed, as were also *Asperula oligantha, Galium australe, Ranunculus parviflorus*, in seed, and *Caladenia pattersoni*, of very low growth, *C. carnea*, and *C. congesta*, the last with a very characteristic and not unpleasant perfume.

From *The Victorian Naturalist* **XXIII**, p. 175, February 1907

## One hundred and twenty-seven years ago

TO WILSON'S PROMONTORY OVERLAND

By J.B. Gregory and A.H.S. Lucas

PART III

...In the Forests tree-ferns filled every gully, and added a charm to every prospect. The mighty Eucalypts with their white trunks towered all around us. Ever and anon as we wound along our ridge track we skirted the head of some valley, which widening out below gave us a view of the timbered heights around and beyond. In the deeper gullies the creeping and climbing ferns formed green bowers of tropical luxuriance without tropical discomfort, as cool as they were lovely. It seemed a desecration to cut the fronds of the tree-ferns in sheaves for our beds, but nature had provided enough and to spare. We found a pretty creeper around the fern-trunks, *Fieldia australis*, the only Victorian representative of the *Gesneraceos*. It was in fruit. The berries are as large as a cherry, pure white, and with the rows of seeds visible beneath the epicarp. Mr. Robinson called our attention to *Sarcochilus parvifiorus*, a pretty and fragrant epiphytic Orchid, which was in full flower. The plants were climbing about dead twigs of probably the Musk Aster. The latter was as usual abundant, and filled the forest paths with a pleasant and not overpowering aroma. *Convolvulus marginatus* and *Billardiera longiflora*, the white corolla of the former tinted with purple, and the lemon-coloured flower-bell of the latter tipped with violet wedges, were also in bloom.

From *The Victorian Naturalist* **II**, p. 88, October 1885

# Australian Natural History Medallion 2011

## John CZ Woinarski

The 2011 Australian Natural History Medallion has been awarded to Professor John Woinarski, for his contribution to conservation biology. John was nominated by the Northern Territory Field Naturalists Club Inc.

John's training is in zoology, undertaken at Monash University, with a PhD on the ecology and conservation of small birds. Since leaving Victoria in 1986, he has devoted almost 25 years to wildlife research in the Northern Territory. Up to mid-2010, he was the Director of the Biodiversity Division in NT's Department of Natural Resources, Environment, the Arts and Sport (NRETAS). John was also a project leader in the Tropical Savannas Co-operative Research Centre throughout its lifetime, and is now a Professor at Charles Darwin University's Research Institute of the Environment and Livelihoods. After nearly half a lifetime in the Northern Territory, John has recently moved to Christmas Island, where he is happily pursuing a range of biodiversity conservation interests.

John is recognised internationally as an authority on the ecology of northern Australia. He has conducted research on a very wide range of conservation and management issues in that area, and complemented that interest with substantial involvement in environmental management and policy. Recent research projects include: the impacts upon biodiversity of a range of land management and other factors in northern savannas; native mammal decline in northern Australia; bioregional inventory and identification of conservation assets; and island arks, involving the translocation of Northern Quolls to offshore islands.

John played a leading role in the development of protocols for rigorous and explicitly quantitative wildlife surveys, which are now employed as standard practice within the Northern Territory and, increasingly, elsewhere in northern Australia. At the Biodiversity Division of NRETAS he led an active research unit that examines options for biodiversity conservation on Aboriginal lands and on pastoral lands, and he undertakes biodiversity monitoring, bioregional survey and conservation planning.

This has led to a long involvement with Kakadu National Park, one of the largest terrestrial national parks in Australia. He was involved in the fauna surveys for stage III of the Park, and has played an ongoing and integral role in the Park since then, through his involvement with the Kakadu Research Advisory Committee.

John's work has been recognised previously with the Eureka Prize for biodiversity research (2001), the Serventy Medal for life-time contribution to Australian ornithology (2001), the Northern Territory Tropical Knowledge Research and Innovation Award (2008), and the Northern Territory Chief Minister's Award for Research and Innovation (2008).

John has been active on a wide range of national committees, currently including the Threatened Species Scientific Committee, which provides advice to the Australian Minister for the Environment.

John has published about 200 scientific publications, including five books, 30 chapters in books and 150 peer-reviewed scientific papers. The majority of this work has focused on the ecology, biogeography and management of mammals and birds, but his written output also includes a broad range of other subjects such as invertebrates, reptiles, plants, reserve design, fragmentation, forestry, biodiversity monitoring, and island biogeography. He was lead author of *The Nature of Northern Australia* (2007, ANU e-press, Canberra), the seminal work on the biodiversity and ecology of the area. Among his shorter publications are a number of papers in *Northern Territory Naturalist*, the journal of the Northern Territory Field Naturalists Club, of which John has been a long-standing member.

Professor Woinarski was presented with the Medallion by Professor Lynne Selwood, President of the Royal Society of Victoria, on 7 November 2011.

**Gary Presland**
40 William Street
Box Hill, Victoria 3128

Photo by Joan Broadberry.

## Australian Natural History Medallion Trust Fund

The following donations were gratefully received since the last published list (17 December 2010):

| | $ |
|---|---|
| Helen Handreck | 10.00 |
| Kenneth Simpson | 25.00 |
| Phyllis Western | 10.00 |
| Alan Reid | 10.00 |
| David Munro | 10.00 |
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| Launceston Field Naturalists Club | 50.00 |
| Northern Territory Field Naturalists Club Inc. | 50.00 |
| Kaye Proudley | 8.00 |
| SEANA (Sponsorship) | 500.00 |
| Sylvia Buchanan | 10.00 |
| Dr Aaron Floyed | 10.00 |

Donations to this ANHM Trust Fund, which supports the Australian Natural History Medallion, should be sent to: The Treasurer, Field Naturalists Club of Victoria, Locked Bag 3, Blackburn, Victoria 3130. Cheques should be made payable to the 'Australian Natural History Medallion Trust Fund'.

The medallion is awarded annually to a person considered to have made a significant contribution to the understanding of Australian natural history in the last ten years.

**Gary Presland**
Secretary
ANHM Committee

# Little Ravens *Corvus mellori* hunt, kill and eat individuals of two species of shorebird

The Little Raven *Corvus mellori* is an omnivore that occasionally eats small birds. Most birds taken are thought to be eaten as carrion, though several records exist of ravens hunting and killing Budgerigars *Melopsittacus undulatus* and a Spotted Turtle-Dove *Streptopelia chinensis* (Higgins *et al.* 2006). Both cases of bird depredation record Little Ravens attacking from above and stabbing prey to death with their beaks. Here, we report a pair of Little Ravens hunting, killing and eating a lone Sharp-tailed Sandpiper *Calidris acuminita* at Cheetham Wetlands, near Melbourne, Victoria (37° 53' 56"S, 144° 47' 33"E; 420 ha; see Antos *et al.* 2007 for a description). We also report an event which strongly implies they hunted and ate an adult Red-capped Plover *Charadrius ruficapillus*, and observations of hunting and eating eggs and chicks.

**Sharp-tailed Sandpiper**

On 17 March 2010 we were conducting field work as part of a breeding study of Red-capped Plovers (Bywater 2009; Ekanayake 2011) when we noticed a pair of Little Ravens swoop down from a perch on power lines, to a small channel that is used extensively by foraging shorebirds. We witnessed a single Sharp-tailed Sandpiper jumping up towards one of the ravens several times, before the raven wheeled around and descended at the location. The location featured raised embankments on two sides of the channel, upon which the ravens perched, effectively cornering the sandpiper. We momentarily lost sight of both raven and sandpiper, but within half a minute had driven to a point where we observed one raven consuming the recently killed sandpiper. When our vehicle disturbed the ravens, they flew slowly along a roadway, carrying the sandpiper, and landing occasionally to eat more parts of it. This is the first record we are aware of which documents a migratory shorebird species as prey of Little Ravens that was captured by apparently co-operative hunting.

Without knowing the condition of the Sharp-tailed Sandpiper before it was killed, we are unable to conclude whether this species constitutes a regular part of the Little Raven's diet. This may have been an opportunistic kill, given the Sharp-tailed Sandpiper was alone, which is somewhat unusual.

**Red-capped Plover adults, eggs and young**

On 11 November 2010, KE was conducting field work on Red-capped Plovers (Ekanayake 2011) and observed a pair of Little Ravens moving along a raised embankment. Red-capped Plovers nest on these embankments and adjacent edges of the ponds in the study site (Bywater 2009). Both ravens were carrying prey in their beaks. When approached, one raven was seen consuming a bird, the other, an egg. Startled by my presence, the ravens took off to a nearby power pole, dropping the prey to the ground. Upon closer inspection it was found that the prey was a Red-capped Plover egg and an adult Red-capped Plover, of which only the right wing, part of the belly and the two legs remained. An ABBBS metal band and a flag with unique two letter engraving were found on the left leg; the bird proved to be a female Red-capped Plover that was captured on her nest by the investigators on 12 March 2010.

This predation event leads us to believe that Little Ravens either adopt a co-operative hunting strategy, or in this case, a strategy involving prey ambush, where they detect an incubating Red-capped Plover and successfully kill it by approaching from behind (many Red-capped Plover nests at the study site are tucked under cover). The condition of the female Red-capped Plover before its death was unknown; however, it was likely to have been in good condition as

it was presumed to be an incubating/breeding bird (since the other raven was consuming a Red-capped Plover egg) and its condition and the presence of the eggs strongly suggest it was not eaten as carrion. Nevertheless, this provides evidence of Little Ravens' ability to hunt, kill and eat not only adult migratory but also adult resident shorebirds.

A pilot study using nest cameras has shown that ravens are the most common cause of nest failure among Red-capped Plovers at the study site (see Fig. 1 for a nest camera image). They have also been seen actively hunting and eating young Red-capped Plover chicks. On 17 September 2009, we observed a pair of Little Ravens attacking a brood of Red-capped Plovers; locating the hidden chicks by walking around the agitated parents, searching in cover and in places atypical of chick refuges, seizing them in their beaks and flying with them to nearby power lines where they were consumed. Thus, Little Ravens prey upon all life phases of Red-capped Plovers.

## Conclusion

These observations support other records indicating that Little Ravens are skilled predators and have the ability to hunt and kill small bird species, including their eggs and young (Higgins *et al.* 1996; Santisteban *et al.* 2002). The study site features abundant ravens, present year round, and they are considered a voracious predator of Red-capped Plovers (Ekanayake 2011 unpubl.). Given that they are generally regarded as superabundant (Barrett *et al.* 2003), their activities may warrant management in future.

## Acknowledgements

Ethics approval for this project was given by AWC A44/2008. This work was supported by the Hermon Slade Foundation, MA Ingram Trust and the Australian Bird and Bat Banding Scheme. We also thank


**Fig. 1**. A nest-camera image of a Little Raven taking a Red-capped Plover egg at Cheetham Wetlands.

Bernie Mccarrick and John Argote from Parks Victoria.

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# A ‘naming tree’ story

## Introduction

In 2002, two eucalypt seedlings were planted in Darebin Parklands, Alphington, as part of a ceremonial ‘naming’ day for six-month old twins. Almost nine years later, the seedlings have become tall saplings offering evolving habitat and amenity for wildlife and the public over future decades and beyond. Reflections on this simple private activity are explored as a potential means to enhance public good conservation.

## Description

On Boxing Day 2002, seedlings of a Red Iron Bark *Eucalyptus tricarpa* and a River Red Gum *E. camaldulensis* (about 0.6 m high) were planted in Darebin Parklands as part of a ‘naming day’ ceremony for six month old twins (Fig. 1). These species were part of the original revegetation of Darebin Parklands by Cam Beardsell in the early 1980s. The species are both long-lived and flower at different seasons, with the Red Ironbark providing important winter flowering for a range of fauna. The seedlings were of local provenance (obtained from LaTrobe University Wildlife Reserve nursery) and planted with the permission and placement advice of Peter Wiltshire (Ranger of Darebin Parklands). The seedlings were staked but otherwise unmarked and were watered occasionally over their first three years (in drought conditions). By 2011, they had become substantial self-sustaining saplings (height 10.0 m and 7.0 m with a dbh of 170 mm and 110 mm, Fig. 2).

The private objectives and incorporated public good outcomes were to:

- provide a focal point for the family, and specifically the children, to watch and reflect upon the growing eucalypts and the changing faunal use of the trees by insects, birds and mammals over their life time;
- watch and observe other peoples’ enjoyment of the site over time;
- actively nurture nature in a public space and provide a small contribution to the greater conservation amenity of the site and to provide decades of habitat availability for wildlife species, both residents and visitors.

The site is periodically visited and, to date, is achieving the initial private aims. The trees have anonymously melded into the overall parklands and will flower in the next few years. They ‘belong’ to two people but simultaneously to everyone – a private meaning with a tangible social and environmental outcome.

**Fig. 1.** Bess and Lil in front of the Red Gum seedling (arrow), Darebin Parklands, Alphington in autumn 2003.

**From private to public**

In the context of quite constant social change, a solid sense of place and connection to nature and landscape may become an increasingly important facet of inter-generational transfer and equity. Two trees are a humble symbol by any standards. However, in Australia in 2010, there were 291 240 births, thus, if taken up by only a small percentage of new parents each year - there are many opportunities for 'naming day' trees in appropriate public spaces to enhance both amenity and personal lives.

Single tree plantings are often associated with public commemorations and many Australians plant trees in their backyards, some of which may have private symbolic meaning. Native seedlings are often provided at other ceremonial occasions (e.g. formal citizenship) for private plantings not necessarily associated with public places. It appears that there are substantial opportunities where private planting in strategic public spaces could enhance local/regional environments across Victoria. The contacts between successive generations may be rewarded by tangibly including nature as part of their growth and sense of place.

Here, local provenance was consciously used, but eucalypt populations on many small public reserves and remnants are, or are becoming, gene-impoverished and may benefit from (controlled) introduction of new genetic stock to strengthen local genomes (Mansergh & Bennet 1989). If carefully selected, this could help natural self-adaptation to climate change, as future pollinators would facilitate cross breeding and natural selection would produce more robust 'local stock' (Weeks *et al.* 2011). Multiple plantings in biolink zones is another variant of the theme where urban families or cohorts of school children could establish a lasting connection with a specific locality in rural Victoria. Such planting would assist the resilience of the vegetation over the changing climate and environmental conditions of their lifetime. As Paul

**Fig. 2.** Wider view of seedling site with the trees at 9 years old (upper arrows at canopy height - Red Ironbark – left, Red Gum – right) in autumn 2011. Open paddock to the north and wetland to the south. Lower arrow site of Plate 1. Milo the kelpie also in attendance.

Kelly (1991) observed in his song about people, landscape and mutual respect: 'From little things big things grow'.


## Acknowledgements

A big thank you to Peter Wiltshire, Darebin Parklands, for planting permission and advice on the best position.


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# The Victorian bush: its 'original and natural' condition

by Ron Hateley

Publisher: *Polybractea Press, Melbourne, 2010. 209 pages, paperback, colour photographs. ISBN 9780977524075. RRP $45.00*

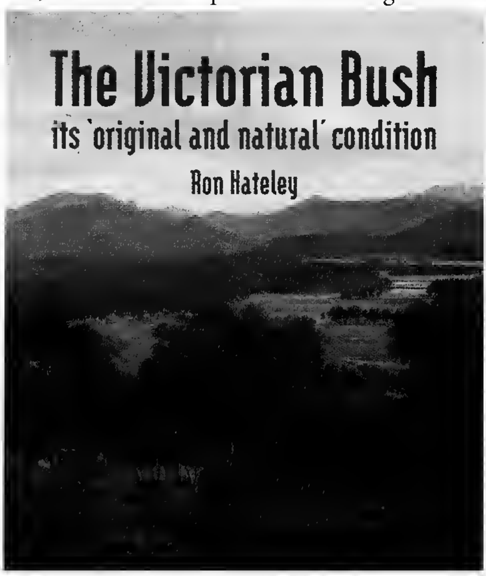
One has to admire a person who undertakes a task as large and complex as the one that the late Ron Hateley set himself with this book. To attempt a reconstruction of the pre-European forest vegetation for the whole of Victoria is no small project. Hateley was a forest ecologist and his primary focus in this book was Victorian forests and, as a corollary, the way in which they have been (and should be) managed. The driving force was a desire to address what he saw as a misunderstanding within the wider public of the extent of pre-contact Aboriginal firing practices within this state. He felt this was leading to inappropriate practices in forest management, particularly in the wake of disastrous fire events such as those of February 2009.

Hateley's reconstruction of the forest regimes of Victoria is based almost entirely on his reading of historical sources. Following a brief introduction to his purpose, and the ecological differences between forests and woodlands, in chapters 2–7 the author successively surveys the earliest accounts of initial exploration of coastal areas, the 1824 Hume and Hovell expedition, the settlement of Melbourne, Victoria's western district, Gippsland, and the goldfields. Throughout, the author hones in on statements that provide insights into the density of forest vegetation. Historical sources can tell us only so much, however, even in the hands of experienced practitioners. It is a puzzle (and one that likely will never be solved, since Hateley died in August 2011) why he did not draw more on his own expertise and offer ecological explanations as to the pre-European distribution and nature of Victoria's forests. Surely aspects of natural history such as the geological substrate, rainfall and elevation have a bearing on the distribution and composition of vegetation regimes? There is a protracted but interesting discussion (pp. 148–157) dealing with the effect on forests of tornadoes, which Hateley saw as a major influence on tree density in Victoria's forests.

The historical overview is followed by a discussion of the impacts of Aboriginal firing practices on the nature and extent of forests within the state (chapter 8). This subject has been discussed and debated back and forth over many years. Hateley continues his method of researching historical sources and quotes from a number of early settlers' writings on Aboriginal life. Particularly, and at length, he uses Brough Smyth's two-volume survey of Victorian Aboriginal culture (Brough Smyth 1878). In his desire to show that Aborigines did not spend much time in the forests, Hateley highlights passages from this source such as 'the rivers were their homes' and 'the rest of the land included within the boundaries of Victoria … was either unknown or frequented for short periods in certain seasons' (p. 89). However, Brough Smyth was never a witness to what he wrote and not always a reliable recorder. In another part of his work (not quoted by Hateley) he writes 'In the months of June, July and August … necessarily the natives moved to the best sheltered spots on the uplands …' (Brough Smyth 1878: I, 140–141), thus providing a contrary perspective. The second view is close to the mark, because the truth of the matter is that the territories of all Victorian language groups included a low country and a high country—and people used both areas, at different seasons. Although Hateley suggests (p.90) that some forest country was ' … probably not permanently occupied' all he showed was a lack of familiarity with the subject. The Aboriginal way of life—gathering and hunting mediated through their traditional lore—neither required nor permitted people to live permanently in one place.

Ultimately, Hateley's discussion of Aboriginal fire practices seems to miss the mark. In all probability he was correct in suggesting that Aboriginal 'firestick farming' had little impact in forested areas. That may be not much of a revelation, but it certainly needed to be said, given the widespread misconceptions that abound amongst the poorly-informed public. Even so, Hateley almost bypasses the major point of regular burning exercises; he discusses various reasons for Aboriginal firing, such as signalling, catching birds, and harassing Europeans, but merely mentions in passing the most interesting and significant reason, which was to promote the growth of herbaceous species that have tuberous roots. Although the term may have been coined in the context of northern Australian practices, surely this is 'firestick farming' at its best? Hateley would have done well to read Beth Gott's piece on the subject (Gott 2005).

This book is well set out, beautifully illustrated, and includes that most essential ingredient, an index. Perhaps the referencing has been overdone: with almost 700 endnotes inserted, the author clearly felt the need to justify everything he wrote. Among a number of minor factual and grammatical glitches, the following stand out:




- (p. 10) the quote from Flemming (whose name is misspelled throughout) is incomplete and misrepresented. It should end '... one-do earth, mostly newly burnt.' This is a curious oversight on the part of the author (who clearly didn't recognise 'do' as the abbreviation for ditto), since the 'newly burnt' probably refers to recent burning by Aborigines, and was thus potentially germane to his argument;
- (p. 26) in reference to the arrival of Hume and Hovell at Corio Bay rather than Westernport Bay, Hateley wrote 'his [Hovell's] longitude was way out (by about eighty kilometres)'. In fact it was out by only one degree; and to spell it out in kilometres was to confuse two different measurement systems;
- (p. 33) Batman's Hill is said to have been flattened in 1863. Actually, only the northern half was removed then; the remainder was not removed until 1892, with the connection of Flinders Street and Spencer Street stations.

Notwithstanding all these quibbles, Ron Hateley's book was a deserving winner in the 'Best print publication' category at the 2011 Victorian Community History Awards. This is testament to both the worth of his study, and the likely enduring value it will have.

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# The Complete Guide to Finding the Birds of Australia

by Richard Thomas, Sarah Thomas, David Andrew and Alan McBride

Publisher: *CSIRO Publishing Australia, 2 edn, 2011. 463 pages, paperback, black and white maps, colour and black and white plates. ISBN 9780643079858. RRP $49.95*

This new edition of the well known guide to finding Australian birds has been much anticipated by birdos in Australia and overseas.

The authors state (page x) that the book is '... intended to help both resident and visiting birders to find as wide a range of bird species as possible in Australia and its territories.' And we think it certainly meets this goal. One of the reviewers (MOB) has not travelled as widely in Australia but found the entries for unfamiliar locations succinct and informative.

The authors would be familiar to most Australian birdos and are eminently qualified to compile this book.

The book is reasonably well designed and laid out with the contents page indicating the states and territories of Australia as well as islands and pelagic birding, followed by a 'bird Finder Guide' (section starting on page 199). This section is well referenced back to the 'States and territories' locality sections so the two methods of finding birds are linked together for the reader.

The book appears to be up to date with current avian taxonomy. For example the White-lined Honeyeater split to give us the Kimberley Honeyeater is there as are suggestions that the Thick-billed Grasswren may be split in future for the western and eastern groups. The use of maps and photographs helps break up the otherwise long sections of text.

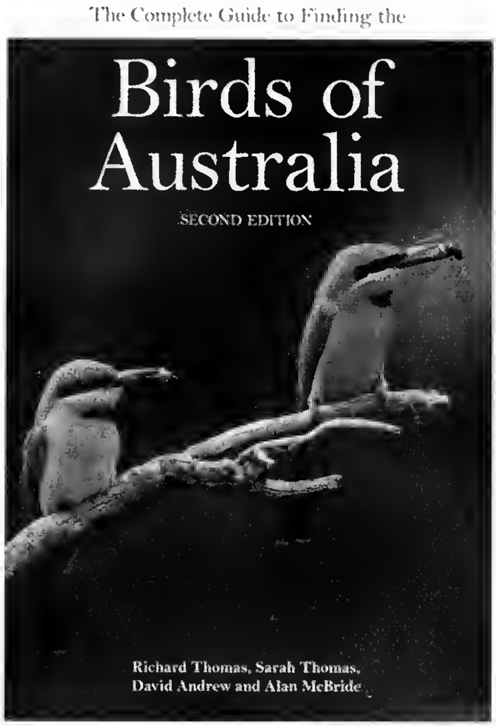
Those considering purchasing the book might like to check a section that is familiar to them and see how well the book addresses the area.

Based on our knowledge of many of the areas covered, the book does a reasonable job of helping the reader to find birds. However, Australia is a big place and a particular bird species may be found in many places, so the book only covers areas where birds may generally be reliably found or where the authors have specific knowledge. However, as most birdos would know, even 'reliable birding places' do not guarantee success so one needs to have some knowledge of possible options other than the ones given in this guide.

Appendix D provides additional information of a more general kind—for example trip planning and travel advice etc. It was surprising to find that the section on Field Guides (p. 418) did not include Birds Australia's *The New Atlas of Australian Birds* (this book may be mentioned elsewhere in the text however we did not find it). In our experience the *New Atlas* is the most helpful book we know of for finding birds in Australia. One can use the Atlas first by finding areas where a species has been recorded and then checking on recorded habitat requirements (via field guides etc.) and any other more specific information for a species, for example local or regional guides, bird trail maps or birds lists for a locality. One can then work out where along a planned route (or area) a subject species might be found. Hence, for anyone wanting to find birds in Australia we would be recommending they also obtain a copy of the *Atlas* or go on line to check the Birds Australia Bird Data database.

The numerous 'mud maps' sprinkled through the text showing birding locations are simple but useful and help orient the reader and support the text. However, good local and detailed maps would usually be required to find many bird locations as the maps in the book are not detailed enough (the authors point this out in the book).

The book may not be much help if you are planning on visiting a specific area and are looking for local information, unless the book just happens to cover the area you are visiting. Even then the book covers only target birds and not the other species you may come across




in the area. For example we purchased a copy thinking it would help with a trip to north-east NSW/south-east Qld. However, we found that this bird-rich area with a large human population and many visitors was not generally covered. However, our target area (Bowra Station) was covered but only to a limited extent. To be fair, the authors do mention that '... this book is not designed as a comprehensive site guide ...' and that they '... have made judgements as to where to find as many of Australia's birds as possible in the most efficient way' (page x).

In these days of internet access to the various state 'BirdLine' websites, birding chatlist (Birding-Aus), interactive eBooks (e.g. Michael Morecombe's Field Guide) and access to detailed topographic maps via hand-held GPS devices, birding guide books have plenty of 'competition' in attracting the attention of the birding fraternity, especially those visiting Australia to find birds.

However, this is a very useful book to all levels of interested naturalists and makes a valuable addition to one's 'birding kit' (along with the other resource tools and research mentioned above). In addition to a number of recent and excellent regional guides (e.g. *Where to see Birds in Victoria*, Birds Australia 2009), this nationwide book is worth purchasing by all birdos.

The guide is a welcome and long-awaited addition to the increasing information available to birdos in Australia and we can heartily recommend it as reference material for both visitors to Australia and to anyone heading to a new location.

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## One hundred and twenty-eight years ago

THE PROTECTION OF OUR NATIVE BIRDS

By A.J. Campbell

(Read before the field Naturalists' Club of Victoria, 9th Feb., 1885)

... There is a circumstance that greatly interferes with our birds, and to which they do not appear, like the birds of Europe or America, to be able to adapt themselves, viz., the alteration of the physical features of the country by the advance of civilization and cultivation. Then there is the havoc made with indigenous forests—their natural resorts. Our Land Administrators seem to alienate our valuable timber lands without framing the slightest regulation against their wanton waste. Another instance, the reclamation of many swamps cannot but seriously affect numerous members of the aquatic tribe, by demolishing their native haunts.

Rabbits over-run large tracts of our colony. Various modes are adapted for their destruction—one extensively used is poisoned grain, which is often taken by some of our beautiful birds. Therefore, it would appear, taking all things into consideration, our birds have a hard struggle for existence ...

From *The Victorian Naturalist* I, p. 124, December 1884

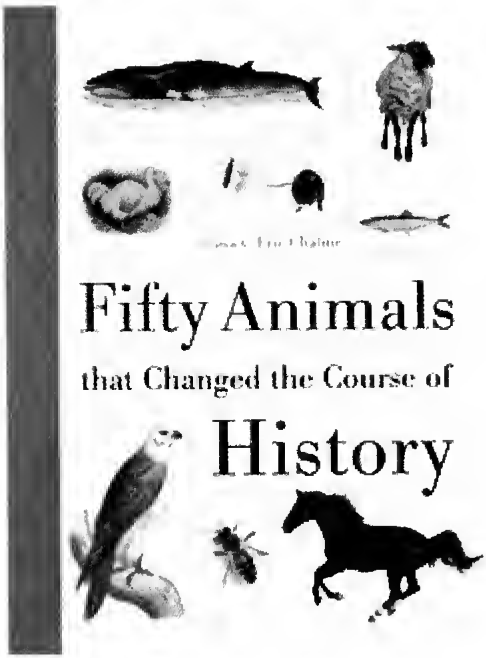
# Fifty Animals That Changed the Course of History

by Eric Chaline

Publisher: *Allen & Unwin, Crows Nest, NSW, 2065. 223 pages, hardback. ISBN 978 74327 713 1. RRP $35.00*

Eric Chaline has selected 50 animal species that have changed the course of human history. Which animal, do you think, he rates as having the 'greatest influence on the course of human history' through being '... the most important edible, practical and commercial species featured'? Which species has come close to wiping out the human species through causing three major pandemics?

The author has presented a delightful book for naturalists; in it, he documents a range of animals that have influenced our history, through their contribution as food, medicines (and disease), commercial or practical value. Some are obvious choices: the honeybee, sheep, goats, camels, horses, silkworms and chickens for their food and usefulness. Pests include rabbits, fruit fly and rats. But also, he has included Darwin's finches and *Iguanodon* for their contributions to our understanding of evolution, Spanish Fly for its use as an aphrodisiac and poison, the Bald Eagle for its symbolic emblem of nationhood (for both Rome and the USA) and the Cobra for its role in myths and legends.




This is a delightfully written book that is easy to read and has loads of useful anecdotes. The answers to my quiz questions? The Cow for the most important edible, practical and commercial species features and the Oriental Rat Flea – vector of the plague pathogen *Yersinia pestis* – which had an essential role in the 'Black Death' and 'Great Plague'!

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